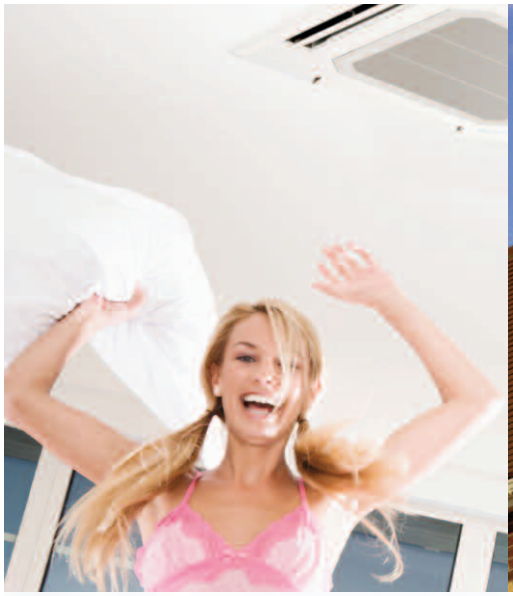



Information Guide:

Legislation on refrigerants

F-Gas and ODS Regulations

Issue **23**

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Information Guide:

Legislation on refrigerants F-Gas and ODS Regulations

This is an independent guide produced by Mitsubishi Electric to enhance the knowledge of its customers and provide a view of the key issues facing our industry today. The guide accompanies a series of seminars, all of which are CPD accredited.

The changing face of construction in the 21st Century demands that designers, specifiers and suppliers work as teams to create better buildings - or occupants and the environment.

Mitsubishi Electric aims to be a part of this by encouraging employees and customers to work together to increase their knowledge of the latest technology, legislation and markets.

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F-Gas and ODS Regulations

A number of different refrigerants are used in the cooling process for air conditioning and refrigeration applications. Two key pieces of legislation are now in force, and affect what type of refrigerants can be used: The European Fluorinated (F) Gas Regulation and the Ozone Depleting Substances regulations (ODS).

There are a number of types of fluorinated refrigerants, including chlorofluorocarbons (CFCs); hydrochlorofluorocarbons (HCFCs) and hyrdofluorocarbons (HFCs). It is these last two types of refrigerant which are used widely in air conditioning systems, either on their own or within a blend. HFCs and HFC blends include R407C and R410A. The well-known R22 is an HCFC.

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The ODS and F-Gas Regulations cover different types of refrigerant (see table below, which includes some refrigerants used by the retail industry in freezers and fridges), but their ultimate aims are similar - to reduce the amount of refrigerant leaking into the atmosphere and damaging the environment; and to reduce the amount of new refrigerants that are potentially damaging to the environment from entering the market. Together, they have important implications for anyone involved in the design, installation and operation of air conditioning systems.

Refrigerant	Type	EU F Gas Regulation	ODS Regulation
R22	HCFC	No	Yes
R408A	HCFC + HFC Blend	Yes	Yes
R134A	HFC	Yes	No
R404A	HFC Blend	Yes	No
R407C	HFC Blend	Yes	No
R410A	HFC Blend	Yes	No

The ODS Regulations resulted from the Montreal Protocol on Substances that Deplete the Ozone Layer. The Regulation came into force in the UK in October 2000, and introduced a number of measures designed to reduce leakage of refrigerants.

For example, only contractors with a recognised refrigerant handling qualification can handle HCFC refrigerants such as R22. Industry estimates show that there are now around 30,000 people with a City & Guilds or CITB Safe Handling of Refrigerants Certificates.

The next stages of the ODS will see the imminent ban on the use of virgin R22 (31st December 2009) and subsequent ban on the use of all R22 from 31st December 2014. See the next feature in this Guide for more details.

The F-Gas Regulation came into force in the UK in July 2008. It had already been introduced into a number of other EU countries in 2007. The main focus of this law is the containment and recovery of certain F-Gases. The F-Gas regulation bans disposable refrigerant cylinders and requires labelling of all HFC refrigerant cylinders and systems. There are also strict rules for the monitoring of all equipment with the potential for leakage of fluorinated refrigerants to atmosphere. Under F-Gas rules, refrigeration and air conditioning equipment containing 3kg and above of refrigerant must be checked for leaks every 12 months. Hermetically sealed systems are exempt up to 6kg. For systems containing 30kg, the checks must be every six months, unless automatic leak detection is fitted (in which case the checks should be annual). Where the charge is 300kg or more, automatic leak detection systems are mandatory and must be checked every six months.

Keeping records of this maintenance is also very important. The servicing technician must be identified in the building operator's records, and the type of refrigerant involved must be recorded as well. Contractors must also provide a logbook which is easily accessed and updated. Existing systems must have a logbook issued at the first test. Any refrigerant leaks must be identified and repaired as quickly as possible, by a 'competent person'. The repair must be re-tested within 1 month. It is the equipment operator/owner's responsibility to adhere to these regulations.

The ODS and F-Gas Regulations are already having a big impact on the maintenance and servicing of air conditioning systems. As ever with legislation of this type, the EU continues to push forward with the possible ultimate goal of removing all F-Gases from circulation.

As we shall see in the next section of this Guide, more tough rules will shortly be in force, which will affect contractors, manufacturers and building operators alike.

Challenges and Opportunities

Of all the F-Gases in use, hydrochlorofluorocarbons (HCFCs) have been particularly targeted by EU legislation for eventual phasing out by 2015. One of the most common HCFCs in use in air conditioning applications is R22.

There are two very important deadlines that building operators must bear in mind. The first is December 31st 2009, when the use and sale of all 'virgin' HCFCs such as R22 will be banned. It is important to note that this includes any refrigerant purchased before the deadline, use of which is also prohibited.

The second deadline is still a few years away, but one which will certainly affect purchasing and maintenance decisions much sooner. On December 31st 2014, the use and sale of recycled HCFCs will also be banned. The use of non-refillable containers for transporting or storing HCFCs is already banned.

The new legislation brings opportunities and responsibilities for everyone involved in manufacturing, installing and using air conditioning applications. Final responsibility for meeting the legal requirements of the F-Gas and ODS Regulations lies with the end users, who must ensure that only qualified people work on the equipment in their buildings. Government is considering fines for breach of legislation, but clients are likely to pass on such responsibility to contractors under service agreements.

At the heart of the Regulations is the principle that leakage of the refrigerants is what causes damage to the environment, and that over a number of years poor maintenance and training in the industry has resulted in too much leakage of refrigerants. F-Gas Regulation means that the industry will be obliged to raise standards in these areas.

In a recent article, Graeme Fox, chairman of the HVCA's Refrigeration and Air Conditioning Group, commented: "A mandatory refrigerant scheme under the F-Gas Regulation will be an important step towards eradicating the rogue trader from the industry once and for all, but it will also put pressure on the industry to bring its skills up to the mark."

There is an urgent requirement for the industry to reduce leakage rates, because of the threat that the next iteration of F-Gas Regulation could also see a ban on R407c and R410A. These are the most energy efficient solutions for many modern air conditioning applications, so the industry would be hard placed to find reasonable alternatives. A review of the F-Gas Regulation is due soon, and a new version will be published in 2011.

There is also a clear overlap between F-Gas Regulation and the EU Energy Performance of Buildings Directive (EPBD), as the necessity to meet tougher new energy efficiency targets under the EPBD means that industry must tackle refrigerant leakage under the former.

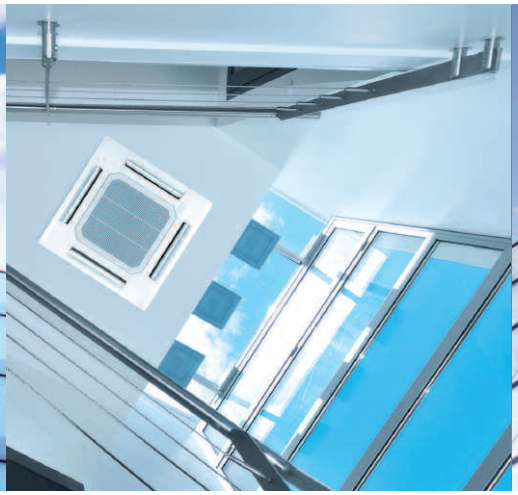
These two deadlines are set to have a huge impact on how building operators manage their R22-based air conditioning systems. R22 stocks are already depleting, creating price increases and leading to reduced availability for maintenance and servicing.

An ill informed approach to the ban on HCFCs could prove expensive, and at worst leave a building without an operational air conditioning system.

Taking action on F-Gases and efficiency - Replacement

The volume of regulations affecting use of air conditioning in buildings seems to be growing at a rapid pace.

As well as the F-Gas and ODS Regulations discussed in this Guide, there are also Energy Performance Certificates and air conditioning inspections, introduced under the EU Energy Performance Directive, to deal with.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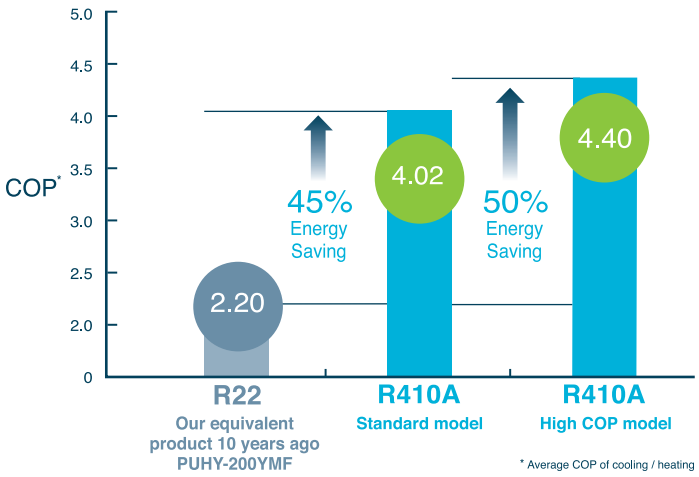
It is possible for building operators to overcome the issues with R22-based air conditioning systems by replacing that refrigerant with a 'drop in' replacement. This is a comparatively low capital cost approach, however there are long-term implications.

Drop in refrigerants rarely operate at high energy efficiency levels, so running costs for the equipment can rise. The process also involves removing all traces of R22, which is comparatively simple, but if the new refrigerant requires different oil, removing the old oil is hard.

An alternative approach is to use the introduction of bans on R22 refrigerant as a sound reason to replace an older air conditioning system altogether. In the past, this has been a very expensive option however modern technologies are now available from leading manufacturers which make this a very cost effective solution.

The most up-to-date replacement techniques can make use of existing pipework, and in some cases even the existing wiring and controls can also be used. The units are replaced with new and more efficient kit, reducing installation costs and disruption to business. The latest air conditioning equipment offers up to 50% energy savings compared to older models (see Graph below). And as energy costs are set to rise, the payback periods for investment in this new technology are becoming shorter.

Comparison of COP (energy efficiency) of a City Multi 8hp YHM-A system



For organisations looking to ensure they meet F-Gas regulation requirements, as well as seeking ways to reduce their carbon footprint and energy bills, replacement is an increasingly viable option, as shown in our case studies.

1. HSBC - replacement of old air conditioning halves energy costs

HSBC bank invested £16 million to replace air conditioning equipment at almost 800 branches around the UK. In the 69 branches where replacement is completed, energy bills have already been almost halved.

By adding other technologies to the mix, such as heat recovery and advanced controls, the bank is reducing CO_2 output by thousand of tonnes per annum. The improved efficiency looks set to save HSBC £2.2 million in operational costs each year.

2. Thorntons - lowering fuel bills and carbon emissions

Following a flood in July 2007 on the ground floor of Sheffield's famous Meadowhall shopping complex, the 54sqm Thornton's store was completely refitted. This included replacement of the store's air conditioning system - vital equipment for a shop which sells high quality chocolate.

The new system utilised existing pipework to reduce down time, and cut installation costs. As a result of the new equipment, the store has dramatically reduced its energy consumption, and Thorntons' is replacing old equipment in other stores across the UK.

Further information

You can find more information on the topic of BREEAM and related issues at the following websites:

www.breeam.org
Official website of the BREEAM family of tools, with advice on training and latest updates.

www.greenbooklive.com
Official website of the Green Book, giving details on the environmental impacts of various construction products.

www.ukgbc.org
Website of the UK Green Building Council which covers various aspects of sustainable building in the UK, and also has news of development of the Code for Sustainable Buildings.

www.decc.gov.uk
Website of the newly formed Department of Energy and Climate Change. At the end of 2008, this site was still being populated with content. It will eventually be a good source of information on the UK Government's energy and environmental policies.

If you missed the CPD seminar on **Legislation on refrigerants**, you can call your Mitsubishi Electric Regional sales office to arrange an in-house presentation of this information.

Please call one of the numbers below:

London North East & East Anglia	**01707 282480**
London North West	**01707 282480**
London South West	**01689 881030**
London South East	**01689 881030**
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